FDA BACKGROUNDER

CURRENT & USEFUL INFORMATION FROM THE FOOD & DRUG ADMINISTRATION

BSE: Background, Current Concerns and U.S. Response

The recent increase in cases of bovine spongiform encephalopathy (BSE) found in some European countries has revived public concern about the safety of eating beef and using other animal-derived products. The largest increase of this fatal neurological disorder in cattle (commonly called "mad cow disease") occurred in France, which reported 99 cases in 2000, compared to 31 cases in 1999. The incidence of BSE-infected cattle is also rising in Belgium and Ireland. Some countries that have not previously seen BSE in their native cattle, including Germany, Spain, Denmark, and Italy, reported their first cases in 2000.

First identified in the United Kingdom (UK) in 1986, BSE peaked in the UK in January 1993 at almost 1,000 new cases per week. The UK has reported more than 180,000 total cases of BSE, and about 1,800 cases have been found elsewhere in the European Union (EU).

Because of the UK's aggressive actions to eradicate BSE since it was first identified, the number of BSE cases is falling sharply in that country. The sudden rise in reported BSE cases in other European countries may, in part, reflect increased testing by some countries, particularly Switzerland and France. In addition, because of the long incubation period of BSE (two to eight years), cows being identified now with BSE may have become infected several years ago.

Rendered feed ingredients contaminated with an infectious agent are believed to be the source of BSE infection in cattle. Some of the feed given to cattle includes ingredients processed from remnants of slaughtered animals, such as meat-and-bone meal (MBM), which may harbor the agent that causes BSE. Although the material is cooked, the BSE agent can survive.

BSE may have originated from giving cows feed that contained MBM derived from sheep infected with scrapie (an infectious neurological disease in sheep and goats, similar to BSE in cows). There is strong evidence, and general agreement, that the original outbreak of BSE in Europe was amplified by feeding MBM prepared from BSE-infected cattle to young calves.

No cases of disease in humans or livestock caused by BSE have ever been detected in the United States. BSE has thus far been kept out of this country largely through the combined efforts of the Food and Drug Administration (FDA), the U.S. Department of Agriculture (USDA), the Centers for Disease Control and Prevention (CDC), other federal organizations, and state regulatory and health agencies. These organizations have taken aggressive actions to reduce the risk that BSE could be introduced and spread in this country. These actions build on a continuing program of prevention, education, surveillance, testing, and emergency preparation.

BSE in Cattle Linked to Disease in People

In 1996, British scientists traced a link between a new variant of Creutzfeldt-Jakob disease (CJD), a rare but fatal disease in humans, and BSE in cattle. Both the new variant CJD and the classic CJD are slow degenerative diseases of the central nervous system whose symptoms include dementia and loss of motor skills. There is no known treatment and the outcome is ultimately death. Only the new variant—not the classic—CJD is believed to be caused by exposure to the BSE agent, most likely through certain foods.

CJD and the new variant CJD (nvCJD) belong to a family of diseases known as transmissible spongiform encephalopathies (TSEs). These diseases, so named because of the spongy appearance of the infected brain tissue, are caused by a transmissible agent that is not yet fully understood. In addition to nvCJD and CJD, three other human TSEs are known, including kuru, which was first recorded in 1957 in the Fore natives of the New Guinea highlands.

Classic CJD occurs sporadically worldwide at a

rate of approximately one case per 1 million people per year, and the new variant CJD and other human TSEs are even more rare.

In addition to BSE, other TSEs have been detected in some species of animals (sheep, goats, mink, deer, elk, and domestic and exotic cats). Most TSEs—with the exception of nvCJD—are species-specific, with no evidence of natural transmission between animals and people.

On March 20, 1996, the UK reported 10 cases of nvCJD. As of Feb. 2, 2001, 98 cases of nvCJD have been suspected or confirmed in the EU. With the exception of three cases in France and one case in Ireland, all have occurred in the UK.

Patients who have acquired nvCJD have been younger and have had the disease longer than patients with classic CJD. (The average age for death from nvCJD has been 27.5 versus 68 in CJD, and the average time to death after the onset of clinical symptoms is 13 months for nvCJD versus less than six months for CJD.)

Britain's Spongiform Encephalopathy Advisory Committee (SEAC) has reported that the BSE agent is the likely cause of the nvCJD. This conclusion was based on studies conducted at the Institute for Animal Health in Edinburgh, Scotland, the Imperial College School of Medicine, London, and the University of California in San Francisco.

No cases of nvCJD have been detected in the United States through CDC's surveillance program. In fact, no illnesses in livestock or humans caused by BSE have ever been diagnosed in the United States, despite 10 years of active surveillance.

Transmission and Testing

Current research suggests the agent that causes BSE and other TSEs is a "prion," an abnormal protein with a novel mode of replication and transmission. Cattle may contract the disease from feed containing animal byproducts contaminated with this protein.

The BSE agent is highly resistant to most disinfectants that normally inactivate viruses or bacteria, such as heat, ultraviolet light, and ionizing radiation. BSE agents do not appear to stimulate an immune response, and so, as yet, cannot be detected with a blood test for antibodies or prevented with a vaccine.

No evidence exists to indicate that BSE spreads through routine contact between cattle or from routine contact between cattle and humans or other species. Some evidence suggests that transmission from mother to fetus may occur at a low level, but this conclusion has not been confirmed. Recent studies have shown that certain healthy animals can get BSE from injections of blood from a BSE-infected animal. F. Houston and Nora Hunter of the Institute For Animal Health, Compton, Newbury, UK, and Edinburgh, UK, reported successful BSE transmission to a healthy sheep that received 400 milliliters of blood from a donor sheep infected with BSE (*Lancet*, September 2000).

Currently, no test can readily detect BSE in a live animal or detect TSEs in healthy humans. The main laboratory method used to confirm a diagnosis is to examine brain tissue after death. Researchers are working to develop new test methods to detect TSEs in live animals and humans.

The U.S. Response

The United States has aggressive BSE surveillance and prevention programs in place. FDA's restrictions on certain animal feed ingredients and its import alerts on cattle products are a critical part of this program. In addition, USDA has an import ban on certain cattle and cattle products, and CDC has established surveillance and investigation programs for suspected human TSE cases.

USDA's Animal and Plant Health Inspection Service (APHIS) introduced import restrictions in 1989, when it banned the import of all live ruminants (cud-chewing animals, such as cows, sheep, and goats) from the UK.

On Dec. 12, 1997, APHIS expanded its prohibition on certain imports to include live ruminants and most ruminant products from all of Europe.

USDA's Food Safety and Inspection Service (FSIS) inspects cattle before they go to slaughter if they show signs of BSE or other central nervous system impairment. Any animals displaying these signs are condemned, and the meat is not allowed to be used in human food. The animal brains are submitted to USDA's National Veterinary Services Laboratories for analysis. Approximately 12,000 cattle brains from nearly every state and Puerto Rico have been examined, with no evidence of BSE or other TSE found to date.

FDA is responsible for ensuring that animal feeds are safe and produce no human health hazards when used in food-producing animals. On

June 5, 1997, FDA published a final regulation that prohibits the use of most mammalian protein in the manufacture of animal feeds given to ruminants. The regulation, which became effective on Aug. 4, 1997, also requires manufacturers to use appropriate process and control systems to ensure that feed for ruminants does not contain the prohibited mammalian tissue.

To ensure that industry was complying with the animal feed regulation, FDA, with assistance from state feed control officials, has conducted nearly 10,000 inspections since January 1998. Inspected firms include feed mills, ruminant feeders, dairy farms, renderers, protein blenders, feed haulers, and distributors. More than three-fourths of all of the inspected facilities were found to be in compliance with the regulation, and nearly 85 percent of the 180 renderers handling prohibited materials were in compliance. The compliance of rendering plants is particularly important because they are the source of most domestic MBM. Sites initially found not to be in compliance have shown a high percentage of compliance upon re-inspection.

Using an innovative, education-oriented partnership program, FDA continues to enforce its 1997 feed regulation. FDA has sponsored workshops for state veterinarians and feed control officials from all 50 states, Puerto Rico, the U.S. Virgin Islands, and Canada. In addition, a joint satellite teleconference with the Association of American Feed Control Officials, the American Feed Industry Association, and the National Grain and Feed Association was broadcast in 1998 throughout the United States and Canada to describe the requirements of the regulations and answer questions from callers. FDA has also developed an interactive CD-ROM that provides information on the regulation and what is expected of those to whom the regulation applies. The CD-ROM is available to FDA, the states, and the regulated industry.

To continue its comprehensive efforts to try to head off a BSE problem in the United States, FDA is conducting additional inspections, and is re-inspecting facilities that were found non-compliant upon initial inspection. Based on the evaluation of the inspections conducted from 1998 through 2000, FDA will revise its compliance strategy to try to assure its goal of 100 percent compliance with the feed regulation.

FDA and USDA recently took further emergency action to prevent potentially cross-contaminated products from entering the United States. On Dec. 7, 2000, APHIS banned all imports of rendered animal proteins, regardless of species, from 31 countries listed as BSE-positive or as presenting an undue risk of introducing BSE into the United States. Prohibited products include MBM, meat meal, bone meal, blood meal, tankage (dried animal residues), and offal (organs, such as brain and liver, and trimmings, such as tails and hooves). FDA has also announced an import alert, allowing its inspectors to detain shipments from these 31 countries of animal feed (including pet food), animal feed ingredients, and other products of animal origin intended for human or animal use.

Protecting Medical Products

In addition to protecting the American cattle herd from BSE, FDA also has taken steps to protect medical products (such as drugs, blood, vaccines, and medical devices) for human use. In 1990, FDA intensified its review of new product applications for human medical products derived from or containing bovine (cattle) sources. FDA recommended to manufacturers of these new products that they not purchase as components animal tissues or products that originated in a country where native cattle have been diagnosed with BSE.

In 1993, and again in 1996, FDA issued letters to the manufacturers of drugs, biologics and medical devices advising them that in the manufacture of FDA-regulated products intended for human use, they should not use materials derived from cattle born, raised or slaughtered in countries where BSE is known to exist. Again in 2000, FDA reissued the same advice to vaccine and other biological manufacturers regarding bovine materials from countries listed by APHIS as having BSE or with an undue risk of introducing BSE into the United States.

FDA will continue its close collaboration with the scientific community and with public health officials, at home and abroad, to take the appropriate preventive actions in response to the growing and changing knowledge concerning TSEs in its ongoing effort to protect the health of Americans and of U.S. cattle herds.